

FIG. 1 (PRIOR ART)

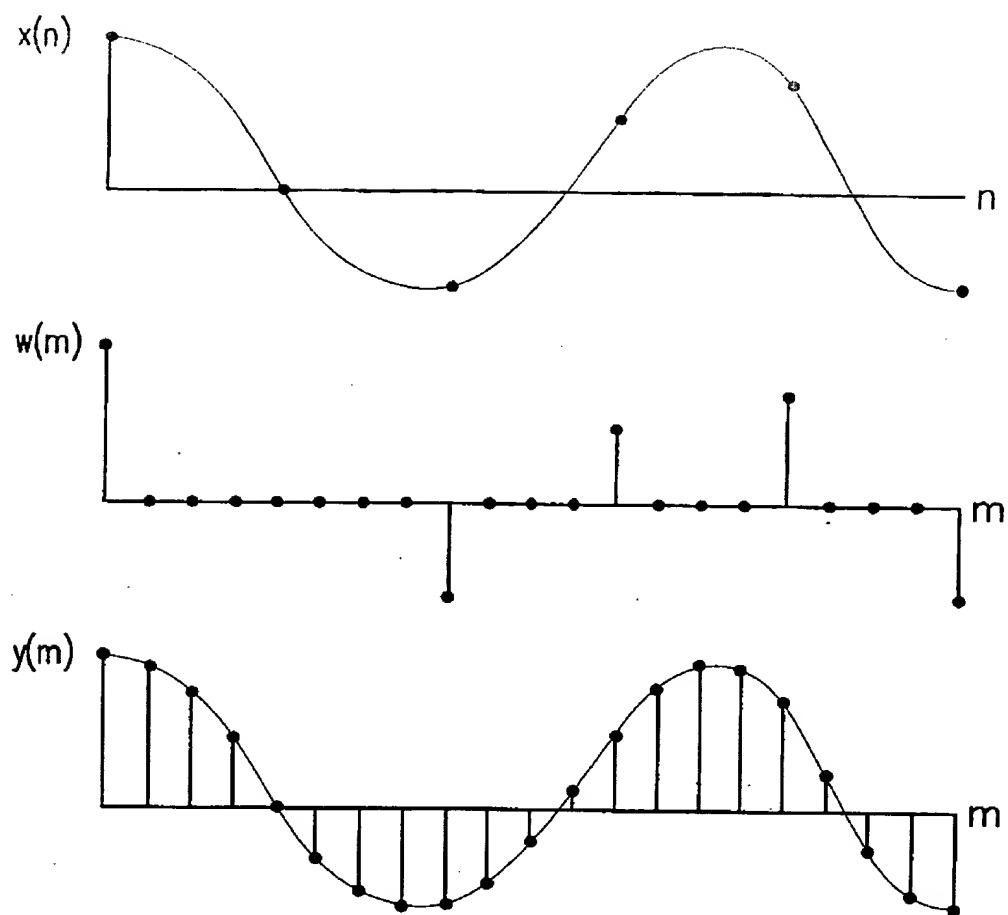


FIG. 2 (PRIOR ART)

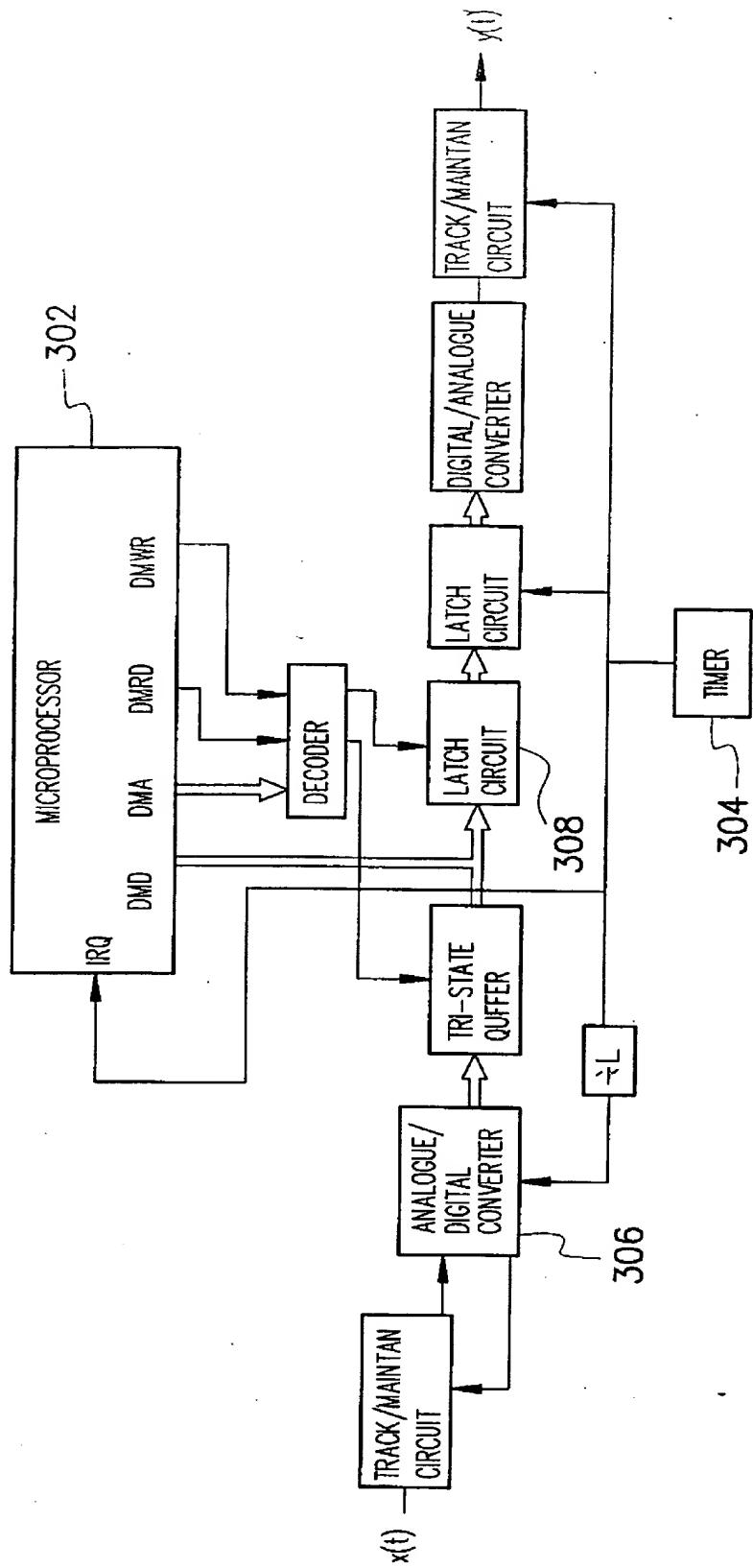


FIG. 3 (PRIOR ART)

{ INTERPOLATE.dsp

Real time Direct Form Filter, N taps, uses an efficient algorithm
to interpolate by L for an increase of L times the input sample rate. A
restriction on the number of taps that N/L be integer.

INPUT: adc

OUTPUT: dac

}

MODULE/RAM/ABS=0 interpolate;

.CONST N=300;

.CONST L=4; { interpolate by factor of L }

.CONST NoverL=75;

.VAR/PM/RAM/CIRC coef[N];

.VAR/PM/RAM/CIRC data[NoverL];

.VAR/PM/RAM/ counter;

.PORT adc;

.PORT adc;

.INIT coef:<coef.dat>;

RTI; {interrupt 0 }

RTI; {interrupt 1 }

RTI; {interrupt 2 }

JUMP sample; {interrupt 3 at (L*input rate) }

initialize: IMASK=b#0000; {disable all interrupts}

ICNTL=b#01111; {edge sensitive interrupts}

SI=1; {set interpolate counter to 1}

DM(counter0=SI; {for first data sample}

I4=^coef; {setup a circular buffer in PM}

L4=%coef;

(listing continues on next page)

FIG. 4 (PRIOR ART)

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M4=L;           {modifier for coef is L}
M5=-1;          {modifier to shift coef back -1}
I0=^data;        {setup circular buffer in DM}
L0=%data;
M0=1
IMASK=B#1000;   {enable interrupt 3}
wait_interrupt: JUMP wait_interrupt; {infinte wait loop}

{ _____ Interpolate _____ }

sample: MODIFT(I4,M5); {shifts coef pointer back by -1}
AY0=DM(counter);
AR=AY0-1;          {decrement and update counter}
DM(counter)=AR;
IF NE JUMP do_fir; {test ant input if L times}

{ _____ input data sample, code executed at the sample rate _____ }

do_input: AY0=DMadc); {input data sample}
DM(I0,M0)=AY0;     {update delay line wiht newest}
MODIFY(I4,M4);    {shifts coef pointer up by L}
DM(counter)=M4;    {reset counter to L}

{ _____ filter pass, occurs at L times the input sample rate _____ }

do_fir: CNTR=NOVERL -1; {N/L since round on last tap}
MR=0, MX0=DM(I0,M0); MY0=PM(I4,M4);
DO taploop UNTLL CE; {N/L-1 taps of FIR}
taploop: MR=MR+MX0*MX0(SS), MX0=DM(I0,M0), MY0=PM(I4,M4);
IF MV SAT MR;        {saturate result if overflowed}
DM(dac)=MR1;         {output sample}
RTI;

ENDMOD:

```

FIG. 4 (PRIOR ART)